Stellaria media
Common chickweed
Caryophyllaceae

Stellaria media is a pernicious urban weed that is also found in oak woodlands, meadows, and disturbed areas below 1300 m. It is native to southwest Europe. Plants are annuals, but often overwinter. They are prostrate to erect, 7-50 cm, with a slender taproot. Stems have hairy internodes. Leaves are more or less evenly spaced with ovate blades 8-45 mm in length. Influorescences are terminal or axiallary with few flowers. Flowers have 5 sepals, 3-4.5 mm, and 5 petals, 0.7-0.9 x the length of the sepals. Seeds are reddish or purplish brown with a papillate surface (Hartman 1996).

The influence of temperature and water potential on the germination rate of *S. media* was studied by Grundy (1997). The results of this study indicate that fresh seeds of *S. media* possess a relatively low germination potential after 6 weeks dry storage. Seeds that were kept in dry storage for more than 1 year took increasingly longer to germinate, particularly under less favorable conditions of temperature and water potential. Germination percentages were highest in 3 year old seeds, and the spread in germination times was largest for the freshly harvested and oldest seed samples. Overall, the number of seeds germinating decreased as the water potential decreased, and the optimum constant incubation temperature for all water potentials was 15 degrees Celsisus. Strong interactions between temperature and seed age were detected; for example, 3 year old seeds were not affected by temperature as much as the fresh seeds and 5-year old seeds, where germination declined significantly outside the optimum temperature range. These results indicate that seed age has a significant effect on germination rate, spread of germination, and final percentage of germination. This heterogeneity of germination behavior may contribute to the success of this weedy species because it leads to the avoidance of rapid or synchronous germination (Grundy 1997).

The effects of nitrogen fertilizer on the growth and density of natural weed populations in spring barley (*Hordeum vulgare*) and winter wheat (*Triticum aestivum*) were investigated by Jornsgard et al. (1996). An increased level of applied nitrogen did not enhance weed germination, and tended to decrease the total weed biomass and had a differential effect upon the biomass of individual weed species in both wheat and barley. In competition with wheat, *S. media* had lower nitrogen optima than the crop. Nitrogen appears to be limiting for *S. media*, but increasing N levels increases crop biomass to the point where competition reduces weed biomass. The authors suggest that fertilizer usage can be exploited in an integrated weed management program. The existing trend in reduced N application, at least in Scandanavia, will favor most weed species, including *S. media*, and change the composition of weed populations (Jornsgard et al. 1996).

Navas et al. (1998) studied the influence of cucumber mosaic virus (CMV) on the growth response of *S. media* to nitrogen availability. S. media is probably the overwintering host of CMV in many parts of the world. (Friess and Maillet 1997). They found that symptoms of virus disease increased with increasing nutrient levels. Plant leaf area and biomass

components responded significantly to the effect of nutrient supply at the first harvest and to the effect of both nutrient supply and plant status at the second harvest. The total biomass of healthy plants increased with increasing N concentration at the second harvest whereas the biomass of infected plants leveled off to a maximum at 24 mmol/l of N. At the third harvest significant differences in biomass between healthy and infected plants at the lowest N concentrations. In general, the negative influence of CMV on plant growth increased with productivity. A major consequence of the influence of the virus could be a difference in the population dynamics of *S. media* in sites of different productivity. Furthermore, Friess and Maillet (1997) found that S. media plants infected with CMV were competitively disadvantaged when grown with healthy plants, the disadvantage increasing with density and the proportion of healthy plants. Investment in reproduction was reduced in infected plants at all densities and in healthy plants at high densities.

Van Acker et al. (1997) investigated the effect of *S. media* on *Hordeum* seed production and the effect of *Hordeum* on seed production in *S. media*, with the intent of evaluating the effect of interspecific weed interference on weed seed production. The results indicated that the presence of *Hordeum* reduced *S. media* seed yield, and a barley population of 100 plants/m2 can reduce *S. media* seed yield by 79%.

The control of *S. media* in cereal crops has received a great deal of attention. In a study of the effects of crop rotation and tillage on weed species diversity Stevenson et al. (1997) found that infrequent use of tillage and herbicides in a barley-forage crop rotation put less selection pressure on weed communities and allowed annual broadleaf species such as chickweed to proliferate. Use of chisel plowing, as opposed to moldboard, favored the established of annual broadleafs, such as *S. media*.

Considerable amounts of research into controlling *S. media* with minimal herbicide application has been conducted in Scandanavia, where the reduction of herbicide dosage is considered to be desirable. Dosage reduction increases the importance of the weed spectrum, the growth stage of the weeds in question, and the weather conditions before and after application. For example, Petersen and Jensen (1987, in Lundkivst 1997) showed that *S. media* was controlled with one-eight of the recommended dose of chlorosulfuron, while the full dose was required for *Veronica* sp. The influence of growth stage was studied in an experiement in which bentazone + dichlorprop was applied to *S. media* and *Chenopodium* album at four growth stages. The best effect was obtained when applying the herbicide at an early growth stage (0-2 leaves) (Kudsk 1989, in Lundkivst 1997). The influence of weather on the effect of reduced doses of two herbicides on *S. media* and other barley weeds was studied by Lundkivst (1997), who found that the most pronounced effects of weather occurred on the day of and the day before herbicide application , revealing a strong influence of weather on herbicide uptake and plant metabolism. High air temperatures and low global radiation during the day reduced the ED_{80} (dose required to achieve 80% control) of dichlorprop-P/MCPA, while the required dose of tribenuron-methyl increased. For both herbicides, precipitation and high soil temperature increased the ED_{80} dose.

References

Friess, N. and J. Maillet. 1997. Influence of cucumber mosaic virus infection on the competitive ability and reproduction of chickweed (*Stellaria media*). New Phytol. 135:667-674.

Jornsgard, B., K. R. Rasmussen, J. Hill, and J.L. Christiansen. Influence of nitrogen on competition between cereals and their natural weed populations. Weed Research 36: 461-470.

Kudsk, P. 1989. Experiences with reduced herbicide doses in Denmark and the development of the concept of factor-adjusted doses. In: proceedings 6th Danish Plant Protection Conference, Nyborg. 196-203.

Grundy, A.C. 1997. The influence of temperature and water potential on the germination of seven different dry-stored seed lots of *Stellaria media*. Weed Research 37:256-266.

Hartman, R.L. 1996. Caryophyllaceae. In The Jepson Manual of the Higher Plants of California. Hickman, J.C., Ed. p. 496. University of California Press, Berkeley.

Lundkivist, A. 1997. Influence of weather on the efficacy of dichlorprop-P/MCPA and tribenuron-methyl. Weed Research 37: 361-371.

Nava, M., N. Friess, and J. Maillet. 1998. Influence of cucumber mosaic virus infection on the growth response of *Portulaca oleracea* (purslande) and *Stellaria media* (chickweed) to nitrogen availability. New Phytol. 139:301-309.

Petersen, E.J., and Jensen, P.E. 1987. Resultater fra afprovning herbicider og vaekstreguleringmidler i korn. Institute of Weed Control. Flakkebjerg, Denmark.

Stevenson, F.C., A. Legere, R.R. Simard, D.A. Angers, D. Pageau, and J. Lafond. 1997. Weed species diversity in spring barley varies with crop rotation and tillage, but not with nutrient source. Weed Science 45:798-806.

Van Acker, R.C., P.J.W. Lutman, and R.J. Froud-Williams. 1997. The influence of interspecific interference on the seed production of *Stellaria media* and *Hordeum vulgare* (volunteer barley). Weed Research 37:277-286.